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Autonomy as a Moderator of the Relationship between Situational Constraints and Task Performance

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AUTONOMY AS A MODERATOR OF THE RELATIONSHIP BETWEEN
SITUATIONAL CONSTRAINTS AND TASK PERFORMANCE

A Thesis
Presented to
the Graduate School of
Clemson University

In Partial Fulfillment
of the Requirements for the Degree
Master of Science
Applied Psychology

by
Kalifa K. Oliver
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Accepted by:
Dr. Thomas W. Britt, Committee Chair
Dr. Mary Taylor
Dr. Fred Switzer

ABSTRACT

This study examined the effects of budget constraints on task performance, and the moderating effect of autonomous motivation on the constraint-performance relationship in a simulated work situation. Level of budget constraints (none, low, high) and motivation (external versus identified) were manipulated to examine their effects on performance, frustration, and self efficacy. Study participants were randomly assigned to either one of six experimental groups (no constraint X identified motivation, low constraint X identified motivation, high constraint X identified motivation, no constraint X external motivation, low constraint X external motivation, high constraint X external motivation) and instructed to complete an assigned budgeting task. After completing the task, they were asked to rate their levels of perceived constraints, frustration, and self efficacy, as well as subjective task importance. Finally, using slightly modified versions of Ryan and Connell's (1989) Self-Regulation Scale, participants were asked to rate their levels of the five distinct motivation types toward the task. Results from the experimental groups revealed significant main effects for constraints on performance and frustration; however motivation did not moderate either relationship. A discussion of the results as well as limitations and directions for future research are also presented.

DEDICATION

To my parents- Trevor and Camlyn Oliver:

For your unwavering support, constant encouragement and unconditional belief in and love for me. I love you so much, thank you for everything.

To my siblings- Aisha, Malika and Chris:

You guys are the best! Who could ask for better and more successful siblings? Thank you for your shining examples and for always being there for me. Love you always.

To my best friends and support group- Ryan, Megan, Yurai, and DeVonn:

Thank you for always encouraging me especially during my crazy times. Love you guys!

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Special thanks to Gerren Evans for putting in hours in the studio to help me with the recording of the audio instructions for the experimental study in this paper.

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CHAPTER 1

INTRODUCTION

In the field of Industrial-Organizational psychology, one of the ultimate goals is to maximize employee performance. Human capital is an important factor in the growth and development of companies, even in technologically-intense industries, and as such failure of employees to perform well can severely harm the profitability and longevity of firms. Companies devote considerable financial resources and time in optimizing their recruitment, selection, and training processes to predict and maintain peak performance by employees. Industry is continually searching for methods to predict and maintain favorable (productive) performance levels and seeks to understand factors that may undermine exemplary performance. As a result a substantial amount of literature in the field of industrial-organizational psychology has been devoted to examining factors that may promote or hinder performance. Some of these factors are dispositional, such as personality type and intelligence level; while others are situational, that is, variables that exist completely out of the control of the employee (e.g. availability of material and supplies). Dispositional variables have been more widely researched in the performance literature. Research on the effect of situational variables is more limited, and in many cases inconclusive. The effects of situational variables are often implied and accepted. Traditionally, attention has mainly been lavished on ability, personality and motivation as predictors of performance.

Peters and O'Connor (1980) suggested that situational constraints then may ultimately have an adverse effect on employees by limiting the influence that a person's

self motivation processes may have on expected performance. One current theory that looks at motivation from a holistic perspective is Ryan and Deci's (2000) continuum of autonomous motivation, that is motivation that comes from a person's feeling that there little to no dissonance between the activity being carried out and the values that reflect the self. This theory suggests the possibility that the higher the degree of motivation on the continuum, the more likely a person will try to perform well in spite of situational factors that may hinder their performance. The purpose of this present study is to examine the effect of situational constraints on overall performance, and to examine how the continuum of autonomous motivation moderates the relationship between situational constraints and task performance. I propose that people motivated by more autonomous reasons should perform better in spite of the presence of increased situational constraints.

This paper is organized into three main sections. First, I will review the current research on situational constraints as related to the workplace and performance. I will explore the major definitions, implications of situational constraints, and their purported effects on performance. This will be followed by a section reviewing and exploring the literature on the continuum of autonomy. Finally, I will look at the potential moderating effect of degree of autonomy in the relationship between situational constraints and performance, and propose a method to test this relationship.

Situational Constraints

Situational factors can act as facilitators or inhibitors of performance (Villanova & Roman, 1993). More emphasis has been placed on the constraining side of situational variables since it is expected that constrained workplace situations should be detrimental to employee performance in a more pronounced manner. Note that it is also expected that

situations that provide more resources than necessary should have the opposite effect on performance (Bakker, Demerouti & Martin, 2005). The literature is not clear on how one decides when resources are too much or too little. It appears to imply that the definition of adequate resources may be subjective and may differ depending on such things like a person's status at work, knowledge of resources needed for work, etc.

Situational constraints are acknowledged but understudied variables that may be present in an employee's immediate work environment. Examples of situational constraints include lack of task-relevant information, tools, materials and supplies. They are usually completely out of the control of the employee and can have a direct and pervasive impact on overall performance (Peters & O'Connor, 1980). Previous conceptual models have demonstrated the importance of situational conditions as partial determinants of performance (Campbell, Dunnette, Lawler & Weick, 1970; Dachler & Mobley, 1973; Schneider, 1978; and Terborg, 1977).

Campbell, Dunnette, Lawler and Weick (1970) were the first to include situational constraints as a component of task demand. They suggested that situational constraints interact with training and development tasks, individual difference variables, and reward structures to influence performance. At that time no model of performance had explicitly included situational factors as even a partial determinant of performance. Similarly, situational factors, referred to as "resource inadequacy", were proposed as possible contributors to work stress and thus were seen as indirectly influencing performances outcomes (Kahn, Wolfe, Quinn, Snoek & Roenthal, 1964; Kahn & Quinn, 1970). However, situational constraints as an area of study did not receive attention in any systematic way.

Peters and O'Connor (1980) were the first to fully operationalize and do a thorough examination of situational constraints in the workplace. To identify situational constraints that exist in the workplace, Peters and O'Connor (1980) solicited 62 employees from multiple jobs to outline examples of poor performance caused by situational factors. They then used the content obtained from these responses and analyzed them. The result was the identification of eight resource variables necessary for employees to successfully accomplish tasks across a variety of works settings. They suggested that these resource variables differed along three dimensions: (a) availability, (b) quantity, and (c) quality. Peters and O'Connor's (1980) taxonomy of 8 sub-groups of situational constraints is the most widely accepted method of identifying constraints in the workplace as described in Table 1(See Appendix A). Please note that some of these categories may overlap. For example, an employee may not have adequate materials and supplies to meet performance goals as a direct result of lack of budgetary support.

Peters and O'Connor's (1980) subgroups consisted of job-related information, tools and equipment, materials and supplies, budgetary support, required services and help from others, time availability, and work environment. Since employees have little control over these work-related factors, when one or more of these factors are decreased or absent, negative work related outcomes (such as poor performance and decreased job satisfaction) are expected.

Of Peters and O'Connor's eight sub-categories of constraints, budgetary support has been heavily overlooked. Budget allocation refers to the monetary resources needed to accomplish any aspect of any given task. According to Peters and O'Connor, budgets have great direct impact on other situational variables at work such as materials and

supplies, and tools and equipment. Krawitz (2003) defined budgets as quantified, planned courses of financial action over a definitive time period (usually annual). Budgets are used to estimate inputs costs and outputs and revenues from outputs based on expected departmental revenues and expenses. The knowledge about actual consumer demand for products and services can be used to realistically allocate resources required to meet that demand. Through budget assessment and planning organizations are able to stratify their priorities most effectively and efficiently. Such planning flags potential problems in sufficient time as to take corrective actions and creates a baseline against which actual results can be compared (Dickey & Hicks, 1992).

Budgets use a standard measurement (dollar figures) to compare expected input and output levels to actual input and output levels. If the actual dollar amounts delivered through the financial year turn out to be close to the budget, then there is an indication that there has been successful use of financial resources. On the other hand, if the actual dollar amounts diverge significantly from the budget, this indicates an inadequate allocation of resources. In corporate settings, this may negatively affect the company's share prices (unless the dollar amounts diverge because they have more than they need).

In situations in which there is an indication of a negative misallocation of financial resources, there can be an internal impact on employee performance levels (their performance may have been constrained due to lack of budgetary support). Since performance tends to be attributed to the individual employee rather than situational variables, this may cause incorrect performance assessments that may have negative work-related consequences (for example the employee may not be promoted due to poor performance). Despite the utility of budget information across situational domains in the

workplace, I could not find any research specifically focusing on budget constraints on performance.

Situational Constraints and Performance

Situational constraints should have a negative effect on overall performance.

Situational constraints are hypothesized to directly affect performance; to the extent that situational constraints hinder utilization of ability, performance should be reduced (Peters et. al., 1980). Phillips and Freeman (1984) proposed that employees in work settings with high situational constraints are expected to experience frustration because they are unable to achieve necessary goals. Such frustration, as predicted by Vroom (1964), for example, should lead to lower levels of performance. Such views have received support from previous studies that have examined the constraint-performance relationship (eg. Villanova & Roman, 1993; Gilboa, Shirom, Fried and Cooper, 2008).

Villanova and Roman (1993) conducted a meta-analysis of 15 studies examining situational constraints and performance. Their inclusion criteria were (a) the examination of situational constraint influence on employee behavior and attitudes, and (b) the study having an adequate description of sample, measurement, analyses and findings. They found that the actual influence of constraints on outcomes such as performance and job satisfaction is highly inconclusive. They recorded, on average, an effect size of -0.14 across 15 studies for the constraint-performance relationship. They suggested that this small effect size, coupled with fact that the number of studies they could find was small, was an indication that researchers had not been able to conclusively support the intuitive assertion that situational constraints should have a negative impact on performance.

They suggested there might have been limitations in the methodology used in the studies in terms of the measurement of both constraints and performance. The authors concluded that the expected constraint-performance relationship had not changed since Peter and O'Connor's (1980) review. This finding was consistent with the one thirteen years earlier despite the fact the Villanova and Roman (1993) included twice the amount of studies. This indicates that the status of the constraint-performance relationship has yet to be conclusively or strongly established. This may be attributable the limited number of studies available on the subject. Another possibility is social desirability issues since ratings obtained for performance and constraints tend to be self-ratings or supervisor ratings.

Gilboa, Shirom, Fried and Cooper (2008) built on the work of Villanova and Roman (1993), examining the relationship between situational constraints and both general and supervisor ratings of performance [across 8 (N=1915) and 7(N=1864) studies respectively] and found a meta-correlation of $-.24$ with both performance measures. This correlation is larger than Villanova and Roman's (1993). A potential explanation for this inconsistency is that Gilboa, et al. (2008) used different criteria for inclusion than the 1993 meta-analysis. For example, they excluded objective ratings of performance by informed judges as they sought to include perceived stressors. Such a big difference in meta-correlations emphasizes the point that the constraint-performance relationship may be more complex than it appears on the surface. This gives rise to the possibility that other factors may be playing a role in this relationship.

I will take the literature further by specifically examining the effect of budgetary constraints on task performance, and whether motivation for the task moderates this

relationship. Since evidence suggests that situational constraints have a negative relationship with task performance, it should follow that increases in budget constraints should also have an overall negative relationship with task performance.

If performance should deteriorate under constrained circumstances, why do companies still thrive and report high performance during fluctuating economic circumstances, and financial downtimes? According to economic theories of demand and supply, resources are not unlimited. This would mean that many companies work with less of a budget than they would like to. How, then, can there be high performance and even innovation in work situations with restricted or constrained budgets? Can companies report high employee satisfaction and commitment levels, despite a lack of budgetary support (perceived and/or actual)? Activation theory (Scott, 1966) suggests that situational constraints may actually increase motivation on enriched tasks (tasks that require challenge, growth and renewal) by introducing a challenge that was not previously available (Phillips & Freedman, 1984) Thus performance may actually increase in such circumstances. The key to unlocking the relationship between constraints and task performance may be to examine moderators of the relationship. One such moderator is motivation. Next I review a theory of motivation that emphasizes a distinction between pursuing activities for hedonic versus growth oriented reasons.

Self-Determination Theory

Deci and Ryan's (1985) self-determination theory (SDT) distinguishes between two types of motivation that affect human behavior based on the different reasons or goals that give rise to an action. Intrinsic and extrinsic motivations refer to the basis upon which a person desires to engage in a particular behavior. Intrinsically motivated

behaviors are ones for which the rewards are internal to the person, i.e., the activity is inherently interesting or enjoyable to the performer; whereas extrinsic motives are those that the person performs to receive external rewards or punishment, i.e., the performer does the activity because it leads to a tangibly separable outcome. This, however, is the most basic distinction between these two concepts.

The authors took their examination of motivation further than simply internal vs. external motivation. They introduced a second sub-theory called Organismic Integration Theory (OIT), in which they detailed a taxonomy of motivational types from amotivation to intrinsic motivation. Along the continuum between the amotivation and intrinsic motivation benchmarks are different forms of extrinsic motivation and the factors that can advance or obstruct the internalization or integration of certain behaviors. SDT proposes that all humans must be motivated by something and such motivation, whether intrinsic or extrinsic, can be driven by one of three psychological fundamental psychological needs. Deci and Ryan (2000) later proposed these needs as relatedness, autonomy (control), and competence. *Relatedness* refers to the human desire to feel cared for by or connected to others. (Ryan, 1993; Bowlby, 1958; Harlow, 1958, Baumeister & Leary, 1995). *Autonomy* refers to the person's internal desire to have control over his or her experience and behavior, and have little to no dissonance between the activity being carried out and the values that reflect the self. In other words, autonomy brings about a more integrated and complete sense of self (Angyal, 1965; DeCharms, 1968; Deci, 1980; Ryan & Connel, 1989; Sheldon & Elliot, 1999). *Competence* refers to the feeling that one is actually capable of carrying out a task and being successful at it. In the case of

competence optimal challenges and feedback promoting effectiveness are predicted to facilitate motivation (Deci & Ryan, 2000).

The presence or absence of the fulfillment of these needs coupled with the basis upon which a person chooses to participate in an activity (i.e. internal or external) may predict changes in overall motivation and where a person may fall in the continuum of autonomy. From an empirical standpoint autonomy and competence have been shown to be the most powerful influences on intrinsic motivation, whereas relatedness plays a more distal role (Deci & Ryan, 2000), perhaps because there is an extrinsic component to it.

A closer examination of this continuum, and the factors that are attributable to them, may assist in understanding how motivation plays a role in affecting how situational constraints are perceived, and thus is translated into task performance.

Intrinsic Motivation

As discussed, intrinsic motivation can be defined as the participation in an activity for the inherent satisfaction that can be gained from it rather than from a separable outcome (Deci & Ryan, 1985). Intrinsic motivation is considered a natural tendency for human psychosocial development because actively exploring one's internal interests is necessary for developing knowledge, creativity and skills. This is a significant feature of human nature that transcends all the facets of human existence (Ryan & La Guardia, 2000). Deci (1975) suggested that intrinsically motivated behaviors are the prototype behaviors that people do naturally and without prompting when they have the freedom to follow their inner interests.

Deci and Ryan's (1985) Cognitive Evaluation Theory (CET) (a sub-theory of SDT) purported that competence can enhance intrinsic motivation for any action being performed as it better allows for the satisfaction of that psychological need. Further, competence requires a sense of autonomy to truly enhance the internal reward and need satisfaction derived from pursuance of a particular action. SDT hypothesizes that intrinsic motivation will flourish more readily in a context of relatedness (Ryan & La Guardia, 2000). This context also adds a sense of security that may provide a backdrop to promote intrinsic motivation (Deci & Ryan, 2000). However people often participate in intrinsically motivated behaviors in isolation, so relatedness itself may be a factor that adds security but not as influential as autonomy and competence.

Intrinsic Motivation, Situational Constraints and Performance

Intrinsic motivation is expected to be facilitated by conditions that move toward psychological need satisfaction, whereas any condition that frustrates need satisfaction will undermine intrinsic motivation (Deci & Ryan, 1985). Further, Deci and Ryan (2000) suggested that contextual factors would affect intrinsic motivation because they influence the extent to which people experience autonomy. An example of a contextual factor that may undermine intrinsic motivation is situational constraints.

Situational constraints may make a person feel incompetent despite their being intrinsic motivated to perform a task. The more a person feels that he or she is unable to accomplish a task, the more his or her intrinsic motivation may be eventually be compromised. This notion may have support from Vroom's (1964) Valence-Instrumentality-Expectancy motivation theory. According to this theory, budget constraints may work directly on the "expectancies" component of motivation. In other

words, if an employee's expectancies (prediction of how much effort will lead to task performance) decrease then motivation will decrease as well. Budget constraints should reduce expectancies because budget constraints may mean that no matter how hard one tries, high task performance will be unattainable. However, an employee whose expectancy is lowered by constraints may rationalize the loss if they have high intrinsic motivation (moved by internal factors such as pleasure and self efficacy) in that they may consciously or unconsciously reconfigure their thinking process to perceive the constraints as a challenge.

One may predict then that when faced with budgetary constraints that even though intrinsically motivated employees experience a drop in performance, they are less likely to experience as sharp a decline in performance as less intrinsically motivated employees (assuming that other ways to induce performance are held constant or irrelevant).

Extrinsic Motivation

Deci and Ryan (1985) define extrinsic motivation as the undertaking of any activity in order to attain some separable outcome. They argue that although intrinsic motivation is important, freedom to carry out intrinsically motivated activities becomes curtailed by social demands, roles, and pressures that call for the assumption of more extrinsically related tasks. This is especially critical in looking at a workplace setting. For example, given the necessity of money for basic survival, i.e. food, clothes, shelter, many people work in jobs that do not necessarily give them intrinsic satisfaction. More specifically, left up to their own devices many people would not have a natural inclination to participate in work related activities.

Though most research views extrinsic motivation as a unidimensional construct that is the polar opposite of intrinsic motivation, SDT purports that extrinsic motivation can vary based on its relative autonomy (Ryan & Connell, 1989; Vallerand, 1997). For example, a person may do a task simply because they need to pay rent, and another person may do the same task because they personally grasp its value for the promotion they desire. In both cases the behavior is intentional and related to an extrinsic outcome; however the difference lies in the degree the behavior is autonomous. The latter example entails a personal endorsement and a feeling of choice rather than the former's compliance just to fulfill a basic social need.

SDT proposes that internalization is an ongoing and natural process utilized by individuals to morph social customs into personally endorsed values and self-regulations (Deci & Ryan, 2000). This means that individuals seek to reconstitute external regulations so they can be transformed into more self-determined behaviors. The ultimate purpose is to personally identify with these external motivational forces and assimilate them into their integrated sense of self. Deci and Ryan (2000) point out that the process may be slow, stalled or only partially internalized thus leading to persons having differing degrees of extrinsic motivation.

Deci and Ryan's (1985) OIT sub-theory (previously discussed), describes a continuum of autonomy comprising four types of extrinsic motivation according to the degree of identification and autonomy with the activity being performed. These forms of regulation- external, introjected, identified and integrated- respectively reflect the levels of autonomy associated with the person's extrinsic motivation for any specified activity (with external being the least autonomous and integrated being the most autonomous).

SDT proposes that behavioral regulations ultimately need to be internalized and integrated toward more personal value systems. Only then can self regulation and self determination become more apparent. Internalization is the process of absorbing a value, and regulation is the process of personally assimilating that value so the regulation emanates from the person's sense of self (Deci & Ryan, 2000). The process of identification and internalization is thought of as a continuum ranging from amotivation or unwillingness to active commitment. As internalization increases (as would autonomy and personal commitment), one would expect greater persistence, positive self-perceptions, greater feelings of competence, and a better quality of engagement in the specified activity (Deci & Ryan, 2000).

External regulation. This type of regulation reflects the classic type of extrinsic motivation in which people base their specific behaviors solely on specific external contingencies. In Skinnerian behavioral theory, for example, people base their behavior on the ability or inability to attain a specified reward (or punishment) (Skinner, 1953). External regulation had been found to empirically undermine the impact of intrinsic motivation (Deci, Koestner & Ryan, 1999a). In SDT, this type of behavior is not autonomous and behavior is easily altered simply by adding or removing a desirable (or undesirable) outcome (Deci & Ryan, 2000). In the workplace, externally regulated motivation can be very problematic because of how easily behavior is shifted. In the case of situational constraints, one may predict that performance will be severely negatively related to the addition of constraints for a person high in externally regulated motivation.

Introjected regulation. In this type of regulation, behavior is still relatively external but there is some element of internal motives. Introjection is often apparent as

ego involvement (Ryan, 1982), public self-consciousness (Plant & Ryan, 1985), or false self attributions (Khul & Kazen, 1994). Introjection is a partial internalization of external outcomes which lie within the person but have not really integrated into the person's motivations, values and cognitions, and so is more likely to be more stable over time than external regulation. In the case of the workplace, introjected regulation would be more desirable than external regulation, but it is still too fickle to counter the potential negative effects of situational constraints. For example if someone is completing a task out of a sense of guilt or obligation to a co-worker, once that feeling is gone, they no longer may have any motivation to do the task.

Identified regulation. Identification is the process through which people identify and acknowledge the underlying value and importance of a behavior (Deci & Ryan, 2000). This means that people will be more likely regulate their behavior more internally and come to accept it as their own. As a result, behavior becomes more autonomous. Behavior, however, is still extrinsically motivated because the outcome that moves the person to perform a task is still external rather than simply being a source of spontaneous joy, pleasure or personal satisfaction. This type of regulation should be very stable across time and is expected to be associated with higher commitment and performance (Deci & Ryan, 2000). In the case of the workplace, people who have identified regulation should be more likely to maintain higher levels of performance in the face of problems such as situational constraints. This is probable because people would have greater feelings of commitment, autonomy and competence toward the task. An increase in these feelings is expected to result in people placing personal value toward the task, making it more personally important and meaningful.

Integrated regulation. Integration is considered to be the most complete form of the internalization of extrinsic motivation. Integration involves identifying with the importance of behaviors as well as integrating those identifications with the holistic self (Deci & Ryan, 2000). This means that the specified behavior becomes completely autonomous, and the person feels competent and most likely highly comfortable and related to others who are associated with that activity or behavior. When regulations are integrated people have fully acknowledged, understood and assimilated them to the point that they are reflective of and in harmony with their own personal values and identity (Pelletier, Tucson & Haddad, 1997; Ryan, 1995). Integrated regulation is still however a level of extrinsic motivation because this behavior is not necessarily behavior that would be engaged in when a person is left up to their own devices and have the freedom to engage in activities that bring them personal and natural pleasure. The level of engagement and autonomy can be easily confused for intrinsically motivated behavior but the distinction lies in carefully considering the instrumental consequences of the outcome (i.e. there is still a distinct separable outcome).

In terms of the workplace, integrated regulation may be very desirable as it is the most stable of all levels of extrinsic motivation and can be expected to help maintain and balance task performance in light of problematic and uncontrollable variables such as situational constraints.

Extrinsic Motivation, Situational Constraints and Performance

Given the various reasons that people take on tasks or jobs, and the several practical variables that may pose hindrances to optimal work performance, there are many extrinsic factors that can help or harm an employee's task performance. One can

theorize that as people move from externally regulated to integrated extrinsic motivation, the expected negative correlation between situational constraints and performance is likely to decrease. I therefore propose the following hypotheses:

H_{1a}: There will be a main effect of budget constraints on performance (number of sprockets produced).

H_{1b}: There will be a main effect of motivation type on performance, with participants in the identified condition performing better than those in the external condition.

H_{1c}: There will be an interaction between the motivation manipulation and the constraint manipulation; motivation type will have a greater effect under higher levels of constraints.

H_{1d}: There will be a strong correlation between task importance and performance.

Frustration

Frustration is a feeling of tension that occurs when one perceives that efforts to reach some goal are blocked. It is an affective response that may result when individuals feel that they have fallen behind while working on tasks (Carver, 2004). Employees in work settings with high situational constraints are expected to experience frustration because they are unable to achieve necessary goals (Phillips & Freeman, 1984). This frustration is expected to lead to lower levels of performance (Vroom, 1964). Since higher levels of autonomous motivation are expected to serve as a buffer against frustration, and motivation may increase when a frustrating situation is perceived as a challenge (Phillips & Freedman, 1984), one can theorize that as people move from externally regulated to identified motivation, the expected positive correlation between

situational constraints and frustration is likely to decrease. I therefore propose the following hypotheses:

H_{2a}: There will be a main effect of budget constraints on frustration.

H_{2b}: There will be a main effect of motivation type on frustration, with participants in the identified condition being less frustrated than those in the external condition.

H_{2c}: There will be an interaction between the motivation manipulation and the constraint manipulation; motivation type will have a greater buffering effect (against frustration) under higher levels of constraints.

H_{2d}: There will be a strong correlation between task importance and frustration.

Self Efficacy

Self-efficacy is defined as people's beliefs about what they are capable of achieving and how well they are able to perform at any specific task. Self-efficacy beliefs determine how people feel, think, behave and motivate themselves in any given situation (Bandura, 1986). This means that if a person does not feel like they have the ability to reach a particular goal, or to perform well in a particular circumstance, they may not feel any motivation to perform or complete the given task. Thus, I propose the following hypothesis:

H₃: There will be a main effect of budget constraints on self efficacy.

Exploratory Hypotheses

H_{4a}: The correlation between the measures of intrinsic, identified and integrated motivation with performance will be stronger than those for external and introjected motivation with performance.

H_{4b}: There will be an interaction for intrinsic motivation with budget constraints, with the expected source of the interaction being that the effects of constraints on performance are less strong for those reporting higher levels of autonomous motivation.

H_{4c}: There will be an interaction for integrated motivation with budget constraints, with the expected source of the interaction being that the effects of constraints on performance are less strong for those reporting higher levels of autonomous motivation.

H_{4d}: There will be an interaction for identified motivation with budget constraints, with the expected source of the interaction being that the effects of constraints on performance are less strong for those reporting higher levels of autonomous motivation.

H_{5a}: The correlation between the measures of intrinsic, identified and integrated motivation with performance will be stronger than those for external and introjected motivation with frustration.

H_{5b}: There will be an interaction for intrinsic motivation with budget constraints, with the expected source of the interaction being that the effects of constraints on frustration are less strong for those reporting higher levels of autonomous motivation.

H_{5c}: There will be an interaction for integrated motivation with budget constraints, with the expected source of the interaction being that the effects of constraints on frustration are less strong for those reporting higher levels of autonomous motivation.

H_{5d}: There will be an interaction for identified motivation with budget constraints, with the expected source of the interaction being that the effects of constraints on frustration are less strong for those reporting higher levels of autonomous motivation.

CHAPTER 2

METHOD

Participants and Procedure

A total of 109 students at a mid-sized southern university participated in this study. All participants had either taken a class in college level math, accounting, finance or business management; or had prior work experience in a business environment in which their duties included accounting, stocking and/or financial resource allocation. Participants signed up voluntarily for this study and were given credits for class in exchange for their participation. The final sample included in analysis was 94 students (43.6% males, and 56.4% females). Others were excluded for outlier scores on performance (this is discussed in detail in the analysis section). Twenty seven majors were represented in this sample, the most frequent being psychology (26.6%) and business (19.1%) majors.

Participants were told they were going to create a budget for the hypothetical company My Sprocket Inc., which produces High Definition (HD) sprockets for televisions, cars, and computers (See Appendix E). All participants were shown the same 7 minute standardized video to train them on how to allocate finances to associated resources that will enable them to produce 100 sprockets for the company. They also learned how the company allocates its finances to achieve its maximum expected output level (100 sprockets per week). The training video was only shown once to standardize the process but participants were able to ask questions about the video's contents.

The task simulated a basic work situation. Participants were asked to allocate resources to meet specific output goals outlined by the fictional company My Sprockets

Inc. “Output goal” means the specific maximum number of units of the product that can be produced given the different levels of budgetary support. All participants in all conditions were to work toward achieving the maximum goal. However, they received different amounts of money depending on the budget constraint condition to which they are assigned.

Each participant received a packet containing a budget allocation task based on his or her treatment condition. Further, depending on their autonomy condition, participants received modified instructions with their packet. Participants were encouraged to do their best to meet the output goal of 100 sprockets. Participants were allowed to take as many notes as they would like and were able use these notes to conduct the budget allocation exercise. Participants conducted budget allocation exercises immediately after the training session. Participants were allowed to ask questions during the task. If participants asked any specific questions concerning the financial allocation process, the experimenter stated “get as much output as you can.” Participants were given 30 minutes to work on the task. After the task, participants completed a questionnaire that assessed the degree to which they felt that their motivation toward performing the task was intrinsic, external, introjected, identified, and integrated. They also answered one item “I felt that my budget restricted my ability to produce the desired number of sprockets?” This was completed on a 5-point Likert scale ranging from “strongly disagree” to “strongly agree”. This served as a manipulation check for the constraints manipulation. They also answered two items to measure their frustration. Once finished, packets were returned to envelopes and participants were debriefed.

All participants had 30 minutes to complete the task, the same tools and equipment, the same materials and supplies, the same help from 'management' (the experimenter), and the same work environment and conditions. The task attempted to mirror relatively realistic budgeting procedures.

Design. The design of this study was a 3 (organizational constraints: none, low, high) x 2 (motivation: external, identified) between-subjects factorial. Participants were randomly assigned to experimental groups by the researcher. In addition, the five measures of motivation were used as predictors, along with organizational constraints, in moderated regressions predicting performance and frustration.

Measures and Manipulations

Situational Constraints (None/Low/High). I assigned dollar values to the required resources used to produce sprockets. The numbers were kept relatively low and manageable for the participants in order to make the budget allocation task seem more realistic but not overwhelming to the participants in the study. The high and low constraint values of 90 and 70 (respectively) were chosen so that they would be seen as constraints but would not lead participants to think there was no way they could accomplish the desired goal of 100 sprockets.

The budgets were constrained at 2 levels: low-constraint (the output goal cannot be met even at maximum performance levels; they can only reach 90% of the expected total, i.e. a maximum of 90 sprockets); and high-constraint (at maximum performance levels only 70% of the expected total can be met, i.e. a maximum of 70 sprockets); along with a control group with an unconstrained budget (100% of the expected total can be met, i.e. maximum of 100 sprockets).

A pilot study was conducted to fine-tune the constraints manipulation. 30 participants (10 in each condition) were given the task. Data from 4 participants were subsequently dropped for being outliers, leaving a total of 26 participants. The pilot test was used to alter the constraint levels and time allotted to complete the task if necessary. To do a manipulation check for the constraints condition, I checked the correlation between constraints and perceived constraints. There was a significant correlation between the constraints manipulation and perceived constraints ($r = .652$). Further there was sufficient variance in the number of sprockets produced in all three constraint conditions: control ($M = 112.89$, $SD = 17.09$), low ($M = 80.67$, $SD = 33.49$), and high ($M = 66.37$, $SD = 8.37$). In addition, post hoc tests revealed that all three conditions were significantly different from each other. Finally, the average time taken to complete the study was 25.73 minutes, indicating that the allotted time of 30 minutes to complete the task was sufficient, and would not add time pressure. Therefore, no changes were made to the constraint levels and the time allotted to complete the task.

Identified/ External Motivation. Instructions for participants were based on their assigned condition. In a slightly altered version of Vansteenkiste, Simons, Lens, Sheldon and Deci (2004), participants in the external motivation condition will be told that “doing the budget allocation task could teach you how to save money by allocating finances more efficiently,” which is intended to represent the external goal of attaining monetary benefit. In contrast, participants in the identified goal condition were told that “doing the budget allocation task could help you feel more competent and confident when dealing with finances, which are important skills to possess as a college student,” which was

intended to represent the identified goal of acknowledging the underlying value and importance of a behavior (Appendix B).

To further reinforce the external or identified motivation conditions, I followed the methods used by Burton, Lydon, D' Alessandro, and Koestner (2006). In order to increase the likelihood of participants endorsing statements reflective of their experimental condition, Burton et al. (2006) used a list of statements to which participants could answer either “yes” or “no” before completing the experimental task. The statements focused on either external goals or identified goals depending on the participant’s assigned condition. They expected that when participants responded to these statements it would also prime their motivation toward their assigned condition. To further prime participants, they also asked participants to write about their goal of mastering the course using either external or identified terms that were selected by the experimenters.

Similar to their methods, I used items from the identified and external subscales of Ryan and Connell’s (1989) Self-Regulation Scale to create two lists of five statements; one list for the identified condition and the other for the external condition. Based on their experimental condition, participants received five-statement questionnaires where they were asked to indicate their agreement by writing the word “Yes” (to denote “Yes, I agree at least somewhat” or “No” (No, I disagree completely”) next to each statement (Appendix C). These response options were constructed to increase the likelihood that participants would endorse the statements on the list (Salancik, 1974).

For example, in the identified condition, participants were presented with items such as “Mastering this budget allocation task is important to me” and “I value being able

to learn about financial management from this task,” whereas those in the external condition were presented items such as “I’m doing this budget allocation task because others told me I should” and “Financial management will help me make money in the future.” Burton et al. (2006), in their study, found that all the participants endorsed the vast majority of statements, and they also found no differences in endorsement between priming conditions.

Following the completion of the statement component, participants were asked to write 3-5 sentences about their goal for completing the task in terms of its *value* and *meaning* in the identified condition, and *external forces or authority*, *rule compliance* and *pressure* in the external condition. These words were chosen on the basis of Ryan and O’Connell’s (1989) work (Appendix 3).

Autonomy. To check the identified/external motivation manipulation and to measure specific levels of autonomy, I used slightly modified versions of 4-point scales as used by Vansteenkiste, Simons, Lens, Sheldon and Deci (2004) [based on by Ryan & Connell’s (1989) Self-Regulation Scale]. These scales were used to assess the extent to which participants in the external motivation condition felt like they engaged in the task for external reasons (caused by external forces or pressures) using four items, e.g., “I did the budgeting task because others told me I should”; for introjected reasons (derived from internal pressures such as guilt or the intention to preserve one's self-esteem) using four items, e.g., “I did the budgeting task because I would feel bad about myself if I did not do it”; for identified reasons (reflecting the person's self-endorsed values) using four items, e.g., “I did the budgeting task because its content is personally meaningful to me”; and

for intrinsic reasons (motivated by intrinsic task enjoyment) using four items, e.g., “I did the budgeting task because I found it very interesting” (Appendix 4).

The four subscales have been shown to correlate either more positively with subscales closer to it on the continuum of autonomy and more negatively with subscales farther from it (Ryan & Connell, 1989). This means that external and introjected motivation will correlate more positively since they are closer on the continuum, while external and identified motivation will be more negatively correlated since they are further away from each other. The sum of the two controlled subscales correlated negatively with the sum of the two autonomous subscales, $r(200) = -.55, p < .01$ (Vansteenkiste, Simons, Lens, Sheldon & Deci, 2004).

I added a subscale to measure integrated reasons (motivated by identification with the importance of behaviors as well as integrating those identifications with the holistic self e.g., four items “I did the budgeting task because I found it very important for representing who I am.”). These items were slight modifications of those for intrinsic motivation. This subscale was aimed at distinguishing between intrinsic motivation and integrated regulation despite similarities and overlap in expected levels of autonomy. I checked the correlation between these subscales to ensure that two separate dimensions are being measured.

To do a manipulation check for the identified vs. external conditions, I looked for differences on the identified and external subscales as a function of condition. This was a departure from Ryan and Connell (1989) in which the extrinsic motivation subscales were combined into a relative-autonomy index by weighting each style in according to its place in the relative autonomy continuum, or combined to form an autonomous

motivation composite, and a controlled motivation composite as was done by Sheldon et al. (2004).

Task Importance. Task importance was subjectively assessed using five items: “This budgeting task is relevant to my major”, “Completing this budgeting task is important in my major”, “This budgeting task relevant to me”, “Completing this budgeting task is important to me.”, and “I care about how I perform on this budgeting task.” These were completed on a 5-point Likert scale ranging from “strongly disagree” to “strongly agree”.

Performance. Performance was objectively assessed using the number of sprockets the participant produced.

Frustration. Frustration was measured using two items: “I felt frustrated by this budgeting task because I had problems calculating the budget.”, and “I felt frustrated by this budgeting task overall.” These were completed on a 5-point Likert scale ranging from “strongly disagree” to “strongly agree”.

Self Efficacy. Self efficacy was measured using two items: “I felt that I had the ability to calculate the budget.”, and “I felt that I had the ability to complete the budgeting task overall.” These were completed on a 5-point Likert scale ranging from “strongly disagree” to “strongly agree”.

Analyses

All analyses were conducted using SPSS 16. Before testing my hypotheses, I screened my data for univariate outliers.

I then tested the correlation between task importance and performance, then frustration.

I then ran a 3 (organizational constraints: none, low, high) x 2 (motivation: external, identified) between-subjects factorial ANOVAs with performance as my dependent variable. I looked for main effects and interactions. These analyses helped test H_{1a} , H_{1b} , and H_{1c} .

I next ran two 3 (organizational constraints: none, low, high) x 2 (motivation: external, identified) between-subjects factorial ANOVA with frustration, then with self efficacy, as my dependent variables. These analyses helped test H_{2a-d} and H_3 .

Analyses for Exploratory Hypotheses

First a correlation matrix was done on the measures of the 5 different types of motivation.

Next, the continuum of autonomy was examined based on its 5 regulation types across the continuum: intrinsic, extrinsic, introjected, identified and integrated. These analyses were conducted using five individual regressions (one for each motivation type). For each regression, performance was the outcome measure, and a given motivation type and organizational constraints were predictors. In each regression organizational constraints will be dummy-coded and the interaction between the motivation type and the dummy-coded variable were calculated. These regressions were used to test H_{4a-d} .

Finally, another five individual multiple regressions were conducted (one for each motivation type). For each regression, this time frustration was the outcome measure, and a given motivation type and organizational constraints were predictors. In each regression organizational constraints was dummy-coded and the interaction between the motivation type and the dummy-coded variable were calculated. These regressions were used to test H_{5a-b} .

CHAPTER 3

RESULTS

Prior to analysis, an examination of univariate outliers was conducted. Extreme cases were identified in the performance data. Extreme cases were considered cases that were outside + or – 3 standard deviations from the mean score for performance. This study required that participants follow instructions closely in order to allocate resources in the desired manner. Extremely large or small scores on performance indicated that these instructions were most probably either not followed or misunderstood. As a result, 14 univariate outliers were deleted. Also, one case was deleted for missing data. A statistical power analysis previously conducted for 80% power ($r^2 = .75$, $\alpha = .05$, two-tail) for a 3x2 ANOVA indicated that a sample size of 54 (9 participants per experimental cell) was recommended. Therefore, even with the outliers deleted, this sample was 94, with an average of 15 people per experimental cell, and therefore there was still sufficient power for statistically sound analysis. Table 2 provides the means, standard deviations, and correlations of the measured relevant variables in the present research.

Manipulation Checks

Prior to any further analysis, I first determined if the manipulations were effective. With regards to the constraint manipulation, there was a significant correlation ($r = 0.575$, $p < .05$) between constraint condition and the participants' perception of constraints across all motivation conditions. Further, a 3 (organizational constraints: none, low, high) x 2 (motivation: external, identified) between-subjects factorial ANOVAs was conducted with perceived constraints as the dependent variable. There was a significant main effect for budget constraints on perceived constraints, $F(2, 88) = 34.59$

($p < .001$), $\eta^2 = .440$. Post hoc tests were conducted to test the mean differences between the constraints conditions. Results of LSD tests showed that participants in the no constraints condition ($M = 2.75$, $SD = .173$) perceived significantly lower levels of constraints than participants in the low ($M = 4.48$, $SD = .173$), and high constraint conditions ($M = 4.53$, $SD = .170$). However, contrary to expectations, participants in the low and high constraint conditions did not differ in their perceptions of constraints.

I tested the manipulation of motivation condition by using the scores on the identified and external subscales in a 2 (motivation condition: identified, external) x 2 (motivation subscale; identified, external) mixed model ANOVA. The main effect for motivation condition was not significant, $F(1,92) = .502$, $p > .05$. A significant main effect for motivation subscale type was obtained, $F(1,92) = 22.02$, $p < .001$, Eta-squared = .193. Scores on the external motivation type ($M = 2.02$) were significantly lower than the scores for the identified motivation type ($M = 2.40$).

These main effects were qualified by a significant Motivation condition x Motivation subscale interaction, $F(1, 92) = 4.065$, $p < .05$, Eta-squared = .042. In order to decompose this interaction, I first examined the simple effect of motivation subscale at each level of motivation condition (see Table 3). Those participants in the identified condition reported higher scores on the identified subscale ($M = 2.46$) than the external subscale ($M = 1.90$), $F(1,44) = 24.75$. Those participants in the external condition reported equivalent scores on the identified ($M = 2.35$) and external ($M = 2.13$) subscales, $F(1, 48) = 3.35$, $p > .07$. I then examined the effects of motivation condition for each motivation subscale (see Table 4). Participants in the external condition reported higher scores ($M = 2.13$) on the external subscale than those in the identified condition

($M = 1.90$), $F(1, 88) = 4.64$, $p < .05$. However, participants in the identified condition did not report higher scores on the identified subscale ($M = 2.46$) than participants in the external condition, ($M = 2.35$), $F(1, 88) = .58$, $p > .05$. Therefore, some support for the motivation manipulation was obtained.

Effects of Constraints and Motivation Condition on Performance and Subjective Measures

To test the effects of motivation and constraints on performance, a 3 (organizational constraints: none, low, high) x 2 (motivation: external, identified) between-subjects factorial ANOVAs was conducted with performance as the dependent variable. In support of H_{1a} , there was a significant main effect of budget constraints on performance, $F(2, 88) = 8.71$ ($p < .001$), $\eta^2 = .165$. Post hoc tests were conducted to test the mean differences between the constraints conditions. Results of LSD tests showed that participants in the no constraints condition ($M = 1.10$, $SD = .016$) performed significantly better than those in the low ($M = 1.04$, $SD = .016$), and high constraint conditions ($M = 1.01$, $SD = .015$). However, there was no difference between performance in the low and high constraint conditions. H_{1b} was not supported since there was no main effect of motivation type on performance. Finally, there was not a significant interaction between the motivation manipulation and the constraint manipulation, thus H_{1c} was not supported.

To test H_{1d} , a correlational analysis was run to check the relationship between task importance and performance; however there was not a significant correlation ($r = .077$), thus H_{1d} was not supported.

Next, a 3 (organizational constraints: none, low, high) x 2 (motivation: external, identified) between-subjects factorial ANOVA was conducted, this time with frustration as the dependent variable, to test the effects of motivation and constraints on frustration. Relevant to H_{2a}, there was a significant main effect of budget constraints on frustration, $F(2, 88) = 7.14, p < .01, \eta^2 = .140$. Post hoc LSD tests revealed that although, as expected, participants in the no constraints condition ($M = 2.26, SD = .182$) reported feeling significantly less frustrated than those in the low constraint condition ($M = 3.23, SD = .181$), participants in the low constraint condition reported feeling more frustrated than those in the high constraint condition ($M = 2.66, SD = .178$). There was no main effect of motivation type on frustration, thus H_{2b} was not supported.

There was not a significant interaction between the motivation manipulation and the constraint manipulation, thus H_{2c} was not supported. To test H_{2d}, a correlational analysis was run to check the relationship between task importance and frustration; however there was not a significant correlation ($r = -.174$), thus H_{2d} was not supported.

Finally, a 3 (organizational constraints: none, low, high) x 2 (motivation: external, identified) between-subjects factorial ANOVA was conducted, this time with self efficacy as the dependent variable. H₃ was not supported since there was not a significant main effect of constraints on self efficacy, (however it was approaching significance $F(2, 88) = 2.65, p = .077$.)

Exploratory Hypotheses

The motivation subscales closer to each other on the continuum of autonomy tended to correlate more positively, and subscales further apart from each other on the continuum tended to correlate more negatively with each other. As shown in Table 2,

external and introjected motivation were significantly correlated, identified and integrated motivation, were significantly correlated, and integrated and intrinsic motivation are significantly correlated. Intrinsic and external motivation, and introjected and identified motivation, were not significantly correlated but they were related in the expected directions.

The correlations between the five types of motivation, frustration, and performance are also shown in Table 2. There were no significant correlations between the five types of motivation and frustration, thus H_{4a} was not supported. Also, frustration was only significantly negatively correlated with intrinsic motivation, thus H_{5a} was also not supported.

Five individual multiple regressions were then conducted (one for each motivation type). For each regression performance was the outcome measure, and a given motivation type, organizational constraints, and the interaction between motivation type and organizational constraints were predictors. There were no significant interactions with any motivation type and performance, thus H_{4a-d} were not supported.

Finally, another five individual multiple regressions were conducted (one for each motivation type). For each regression, this time frustration was the outcome measure, and a given motivation type and organizational constraints were predictors. There were no significant interactions with any motivation type and frustration, thus H_{5a-d} were not supported.

CHAPTER 4

DISCUSSION

The present study experimentally tested the effect of the continuum of autonomy, particularly external and identified motivation, on the relationship between situational constraints and performance. Results from the study yielded some unanticipated and interesting findings. The remainder of this paper will focus on a discussion of these results. I will first discuss the results associated with each of the hypotheses presented. Next, I will discuss the meaning of the results and possible explanations for the findings (or lack thereof). Finally, I will then focus on limitations of the research and considerations for future research.

Manipulations

Prior to discussing the main results, I would like to discuss the results of the manipulation checks. First I will discuss the constraint manipulation. The budgets were constrained at 2 levels: low-constraint and high-constraint, along with a control group with an unconstrained budget. Results showed that there was a significant positive correlation between the constraint condition and the participants' perceptions of constraints across all motivation conditions. This meant that as constraints increased, so did participants' perceptions of these constraints. Further, participants in the no constraints (control) condition perceived significantly lower levels of constraints than in the low and high constraint conditions, thus indicating that there was a clear distinction between having any type of constraints and not having any constraints at all. However, surprisingly, participants in the low and high constraint conditions did not differ in their perceptions of constraints. This finding indicates that the constraint manipulation was only partially successful.

This result may have been because there was not a large enough difference between low and high levels of constraints for participants to perceive them as significantly different. Another reason for this result may be that the Likert scale used to measure perceived constraints may have been too restricting with the use of qualifying benchmarks to indicate agreement or disagreement levels. Perhaps if a numbered scale (perhaps from 0 to 6) was used to rate how much participants felt that the budget restricted their ability to produce the number of sprockets, there may have been more significant differences in perceived constraints between the low and high conditions. It is worth mentioning, however, that the pilot test that was run prior to this study, had indicated significant differences between all three constraint levels, which is why no further adjustment had been made with constraint levels.

In addition to the constraint manipulation, participants were given instructions that focused on either priming them towards either identified or external motivational orientation toward the budgeting task that followed. In the video instructions, participants in the external motivation condition were told that “doing the budget allocation task could teach you how to save money by allocating finances more efficiently,” whereas those in the identified condition were told that “doing the budget allocation task could help you feel more competent and confident when dealing with finances, which are important skills to possess as a college student”. Depending on the participant’s assigned condition, participants were then asked to endorse statements focused on either external goals or identified goals before completing the budgeting task. Further, participants were asked to write about their goal of mastering the course using either external or identified terms that were selected by the experimenter. Finally, once the task was completed,

participants were asked fill out a questionnaire which included two four-items subscales that measured the extent to which participants felt like they had engaged in the task for external and identified reasons.

Results indicated that participants in the identified condition reported higher levels of identified motivation than external motivation, however they did not report higher scores on the identified motivation subscale than participants in the external condition. Further, although participants in the external condition reported higher scores on the external motivation subscale than those in the identified condition, they reported feeling about the same levels of both external and identified motivation. Thus, the motivation manipulation was only partially successful.

These results were unexpected given the success of these motivation priming techniques in past research (Vansteenkiste, Simons, Lens, Sheldon & Deci, 2004; Burton, Lydon, D' Alessandro & Koestner, 2006). It is possible that the exchange of class credits for participation may have affected the ability to successfully manipulate the motivation types as desired. Given the highly external reward attached to the receipt of class credits, participants may still have had high orientation toward external motivation even when primed to have identified motivation toward the budgeting task. Also, the use of the motivation subscales as a manipulation check for the motivation conditions was (to my knowledge) novel in experimental research on the continuum of autonomy. It is possible that the subscales may have been measuring participants' general level of the different types of motivation rather than their specific motivations toward the actual task. Thus the use of these subscales may not have been ideal for a manipulation check. With the manipulations being partially successful I will now turn to the hypothesis testing.

Effects of Constraints and Motivation Condition on Performance and Subjective Measures

In discussing the effects of constraints on performance, it is important to remember that although performance was initially assessed by looking at the number of sprockets produced, this measure was adjusted by using a ratio of the number of sprockets actually produced to the average number of sprockets that could have been produced at that given constraint level. This was done in order to create a better comparison of performance between constraint levels. This adjustment was an effort to measure the participants' true performance, i.e., the level of output that would have been achieved had the constraints not been present (Lumsden, 1976).

First, H_{1a} stated that there will be a main effect of budget constraints on performance. In support of H_{1a} , results from the study showed a significant main effect of budget constraints on performance. The effect size of $-.17$ obtained in this study was well within the range of the effects sizes found in previous studies that have examined the constraint-performance relationship. Villanova and Roman (1993) in their meta-analysis found, on average, an effect size of $-.14$ across 15 studies; and Gilboa, Shirom, Fried and Cooper (2008) found a meta-correlation of $-.24$ [across 8 ($N=1915$) and 7 ($N=1864$) studies respectively] for the constraint-performance relationship.

As expected, participants in the no constraints condition performed significantly better than those in the low and high constraint conditions. Interestingly, however, there was no difference between performance in the low and high constraint conditions. These results suggest that the difference between the low and high constraint levels were not sufficient to affect performance in any significant way. This may indicate that people

may be able to more easily distinguish between having no constraints and constraints, but not so easily distinguish between different levels of constraints when constraints actually exist. This assumption is supported by the failure to find a difference between perceptions of constraints in the low and high constraints conditions. Further, the constraints in the test may actually have only been low to moderate rather than low and high. Since performance standards were not sufficiently demanding, the impact of low to moderate may have had little impact on performance (Villanova & Roman, 1993). Perhaps to discriminate between mild or moderate and high constraints, high constraints must be severely handicapping in order to be perceived as more constraining than lower levels, and thus adversely affect performance.

Another explanation may be that the nature of the task may not have allowed for differences between the low and high levels of constraints. According to Kane (1993), effective performance needs to be required of individuals in order to attain associations between constraints and individual performance. If high standards are not expected and enforced, performance is less likely to be strongly determined by factors expected to affect performance. This task was experimental and used students who were receiving class credits for participation regardless of their performance. Although efforts were made to encourage good performance, there were no adverse (or otherwise) consequences as a result of bad (or good) performance. Thus, once the participants in the low and high constraints encountered and perceived constraints, they more than likely viewed them as simply constraints (as opposed to low or high).

Finally, there was little variance in the amount of sprockets that could have been produced despite efforts to increase the amount of degrees of freedom involved in the

budget for producing these sprockets. As mentioned earlier, the pilot study had indicated higher levels of variance within and between the levels of constraints. Unfortunately, the variability within conditions found in the pilot study was not obtained in the main experimental study.

After examining the results concerning H_{1a} , I turn to H_{1b-d} . H_{1b} , which stated that there would be a main effect of motivation type on performance, with participants in the identified condition performing better than those in the external condition, and H_{1c} stated that there will be an interaction between the motivation manipulation and the constraint manipulation; motivation type will have a greater effect under higher levels of constraints. The results of the study show that neither H_{1b} nor H_{1c} were supported. For H_{1b} , there was no main effect of motivation type on performance, and for H_{1c} , there was not a significant interaction between the motivation manipulation and the constraint manipulation. Both these sets of results were most likely due to the failure to successfully manipulate the motivation conditions in this study.

H_{1d} stated that there would be a strong correlation between task importance and performance. Results revealed that there was not a significant relationship, thus H_{1d} was not supported. This seems counter-intuitive since one would expect that those who felt that the task was more personally important would be more engaged and thus perform better (Britt, Dickinson, Greene, & McKibben, 2007). It is possible that these results were due to the sample used. College students served as participants in this study in exchange for class credits. Even though students voluntarily signed up to participate, their volunteering was potentially a function of their receipt of these credits rather than actual interest in the task itself. Although efforts were made to make the task more relevant in

terms of the inclusion criteria (more specifically requiring that the students had the skills needed and related to the task), the task still may have been more important to participants simply because of the receipt of class credits toward their final grades, rather than the task itself being personally important. Thus, participants were most likely not as engaged in the task as may have necessary to influence their performance, hence the weak and insignificant correlation. Next I will discuss the second group of hypotheses.

H_{2a} stated that there will be a main effect of budget constraints on frustration. Results revealed that there was a significant main effect of budget constraints on frustration, thus H_{2a} was supported. However, as indicated below, some of the means did not differ from each other as anticipated. In addition, the effect size of .14 obtained in this study was well below the range of the effect sizes found in previous studies that have examined the constraint-frustration relationship. In their meta-analysis, Villanova and Roman (1993) found a meta-correlation of .39 across 7 studies. One reason for this disparity may be that six of those studies assessed in that meta-analysis used Peters et al.'s (1980) 3 item scale to measure frustration; however the measure used in this study used 2 items, one that looked at the task itself as being frustrating and the other looked at the frustration associated with problems calculating the budget. These items were created for this study and as a result may not have been strong enough to get accurate measures of frustration. It would be interesting to see if Peter et al.'s frustration scale would have produced results more in sync with current literature.

Another possibility may be that the frustration items used in this study were unable to measure the levels of frustration accurately due to the nominal scale used. If the items were measured using numbered scales (perhaps from 0 to 6) to rate how much

participants felt frustrated by the task, there may have been a stronger constraints-frustration relationship. Finally, another explanation for the low effect size may be that the nature of the task did not allow for high levels of experienced frustration. According to Peters and O'Connor (1990), blocking the attainment of valued goals is associated with greater frustration. As discussed previously, the task was experimental and used students who were receiving class credits for participation regardless of their performance. Since there were no rewards or punishments attached to their performance, class credits were most likely the main reason for their participation. Thus, the goal of completing the task was probably of more value than the goal of good performance (producing 100 sprockets). This means that although frustration may have arisen merely because there were constraints that blocked the attainment of the task's goal, since this goal may not have been the participants' valued goal, these constraints ultimately did not have as strong effects on frustration as may have been anticipated.

As expected, participants in the no constraints condition reported feeling significantly less frustrated than those in the low constraint condition. Surprisingly, however, participants in the low constraint condition also reported feeling more frustrated than those in the high constraint condition. Further, there was no difference in feelings of frustration in the no and high constraint conditions. While those in the no constraint condition were not expected to experience much frustration (if any at all), intuitively, one would expect that more restrictive conditions would have a linear relationship with higher levels of affective outcomes such as frustration (Peters & O'Connor, 1980). However, the results obtained indicated that there may actually be a curvilinear relationship between levels of constraints and frustration. O'Connor et al. (1984) pointed out that frustration

appears to be a very distinctive affective response that requires additional factors such as goal interference, goal attainment and motivation to be understood. Thus, a possible explanation of these findings may lie in Vroom's (1964) Valence-Instrumentality-Expectancy (VIE) model of motivation.

According to VIE theory, there is a lawful relationship between people's preferences and affective reactions to certain outcomes (valences), their perceptions of the probability of obtaining a certain outcome or outcomes (instrumentalities), and their beliefs about whether specific actions lead to certain outcomes or performance levels (expectancies). People consciously consider their valences, instrumentalities, and expectancies when deciding whether or not to perform a certain act, and they tend to act in a manner that they perceive as optimal once these factors are considered. Thus, if a person believes that performing an action will lead to desirable outcomes; that the achievement of these outcomes will lead to positive affective reactions; and that there is a high probability of realistically achieving the desired outcome, he/she is more likely to be very motivated to perform the action related to that goal or outcome. The opposite should apply when all these criteria are reversed.

In this study, participants in the low constraint condition may have perceived a higher probability of reaching the output goal in the budgeting task than participants in the high constraint condition (instrumentalities). Further, participants in the low constraint group may have believed that performing the necessary actions related to the task (such as calculating and rechecking the number of sprockets that could be produced) would lead to good performance (expectancies), and positive affect (valences). On the other hand, participants in the high constraint condition probably felt that their budget

was too restrictive and would not allow them to reach the task's output goals; therefore good performance and associated positive affect were not perceived as possible. Thus, participants in the low constraint condition were likely more motivated toward the task, and may have placed more value on achieving the task's output goal, than participants in the high constraint condition. Considering that situational constraints should have their strongest effects on persons with the greatest motivation (Schneider, 1975, 1978), and that the extent to which constraints block the accomplishment of valued goals should be reflected by increases in frustration levels (Peters and O'Connor, 1980), then the results obtained in this study seem very reasonable.

This explanation also aids in understanding why there were no differences in frustration between the no and high constraint groups. While those in the no constraint group were expected to have low levels of frustration with the task simply by virtue of there being no restrictions on their ability to meet and even exceed the task's output goal, the high constraint group had similar levels of frustration because of low motivation and low value attributed to the task due to the high levels of constraints.

Next, I turn to H_{2b-d} . H_{2b} stated that there will be a main effect of motivation type on frustration, with participants in the identified condition being less frustrated than those in the external condition, and H_{2c} stated that there will be an interaction between the motivation manipulation and the constraint manipulation; motivation type will have a greater buffering effect (against frustration) under higher levels of constraints. The results of the study show that neither H_{2b} nor H_{2c} were supported. For H_{2b} , there was no main effect of motivation type on performance, and for H_{2c} , there was not a significant interaction between the motivation manipulation and the constraint manipulation. Like

H_{1b-c}, both these sets of results were most likely due to the failure to successfully manipulate the motivation conditions in this study.

H_{2d} stated that there will be a strong correlation between task importance and frustration. Results revealed that there was not a significant relationship, thus H_{2d} was not supported. A weak negative correlation was obtained, which is a surprising result since one would expect that those who felt that the task was more personally important would be more motivated and engaged in the task. As a result, they would be more frustrated by constraints, since these constraints would have interfered with their ability to perform well (Schneider, 1975, 1978; Britt, 2003b). As previously discussed, it is possible that frustration may have simply been a function of the constraints that blocked the attainment of the task's output goal rather than from the participants' inability to achieve a valued goal; and the task may have been more important to participants simply because of the receipt of class credits, rather than the task itself being personally important. Thus, both task importance and frustration may have been picking up confounds that were not originally accounted for in the operationalization and measurement of these constructs. As a result, both variables may have been acting in ways that were not expected in this study, hence their weak and insignificant correlation.

Next, H₃ stated that there will be a main effect of budget constraints on self efficacy. Results revealed that there was not a significant relationship, thus H_{2d} was not supported. This result, however, is supported in work stress literature. For example, Jex and Gudanowski (1992) found that there was no significant relationship between self efficacy and situational constraints. They suggested that self efficacy beliefs are relatively stable across situations, and thus not easily affected by changes in more objective

conditions. By definition, situational constraints are objective features of the environment, out of an individual's control, and do not need to be subjectively perceived as constraints to exist. Therefore, it seems reasonable that situational constraints would not have an impact on a person's personal beliefs in his/her own abilities. In terms of this study, efforts were made to ensure that the participants could have realistic levels of self efficacy. The inclusion criteria attempted to make certain that all participants had the basic skills needed to perform the task, and had unrestricted access to all related information and tools needed to successfully complete the task. Since results showed that self efficacy was generally above average ($M= 3.71$), and that participants' beliefs about whether they had the ability to do the budgeting task was not affected in any significant way by the constraints. There is some support for the notion that situational constraints are indeed more objective features of a given situation, and external to the individual. Next I will discuss the results of the exploratory hypotheses.

Exploratory Hypotheses

For the first group of exploratory hypotheses (H_{4a-d}), H_{4a} stated that the correlation between the measures of intrinsic, identified and integrated motivation with performance will be stronger than those for external and introjected motivation with performance. Results showed that there were no significant correlations between the five types of motivation and performance, thus H_{4a} was not supported. H_{4b} stated that there will be an interaction for intrinsic motivation with budget constraints, with the expected source of the interaction being that the effects of constraints on performance are less strong for those reporting higher levels of autonomous motivation; H_{4c} stated that there will be an interaction for integrated motivation with budget constraints, with the expected source of

the interaction being that the effects of constraints on performance are less strong for those reporting higher levels of autonomous motivation; and H_{4d} stated that there will be an interaction for identified motivation with budget constraints, with the expected source of the interaction being that the effects of constraints on performance are less strong for those reporting higher levels of autonomous motivation. Results showed that there were no significant interactions with any motivation type and performance, thus H_{4b-d} were not supported.

For the second group of exploratory hypotheses (H_{5a-d}), H_{5a} stated that the correlation between the measures of intrinsic, identified and integrated motivation with frustration will be stronger than those for external and introjected motivation with frustration. Results showed that there was only a significant correlation between the intrinsic motivation and frustration, thus H_{5a} was not supported. It is worth mentioning, however, that the significant negative correlation between frustration and intrinsic motivation was consistent with expectations and the situational constraint literature (e.g. Peters & O'Connor, 1980; Deci & Ryan, 1985, 2000).

H_{5b} stated that there will be an interaction for intrinsic motivation with budget constraints, with the expected source of the interaction being that the effects of constraints on frustration are less strong for those reporting higher levels of autonomous motivation; H_{5c} stated that there will be an interaction for integrated motivation with budget constraints, with the expected source of the interaction being that the effects of constraints on frustration are less strong for those reporting higher levels of autonomous motivation; and H_{5d} stated that there will be an interaction for identified motivation with budget constraints, with the expected source of the interaction being that the effects of

constraints on frustration are less strong for those reporting higher levels of autonomous motivation. Results revealed that there were no significant interactions with any motivation type and frustration, thus H_{5b-d} were not supported.

The unexpected results obtained for these exploratory hypotheses may have been related to the inability to successfully manipulate motivation in this study. As mentioned earlier, the subscales may have been measuring the participants' general levels of the different types of motivation rather than more specific, task-relevant levels of motivation, thus the insignificant findings.

Limitations and Future Directions

The present study employed an experimental design. Experimental designs permit the researcher to have more control, and thus the ability to rule out confounding variables, allowing for increased internal validity often at the expense of external validity. Irrespective of the research design, limitations are still encountered in experimental studies, including threats to internal validity. The present study had several limitations that affected both internal and external validity.

As previously discussed, a major limitation of the present study was the sample used. The participants were college students who received class credits in exchange for their participation. It is very likely that the receipt of class credits gave participants a highly external motivation orientation toward that task, thus making the motivation manipulation, and accurate measures of the motivation subtypes, highly difficult. Further, the receipt of these credits, coupled with no perceived reward or punishment attached to performance, may have suppressed the possible effects of constraints on performance and frustration, as well as any interactions.

A second limitation was the study design. In this particular task external validity may have been threatened. For example, the use of the hypothetical industry and product may have decreased external validity. However their use should have also decreased the likelihood of error that may be caused by certain participants having prior knowledge of the industry or product. A pretest was not added in this design because it would have been very likely to sensitize participants to the experimental situation. Such a sensitization may have influenced their responses and subtracted from the possible treatment effect. The use of a standardized video to train participants to create a budget for the company, and the standard answers that the experimenter could have given were placed in the design to help decrease experimenter bias. Also, the way in which output goals were assigned in this design may be an oversimplification of the budget constraints as encountered in more real world situations.

The situational constraints were controlled so that only the budget was constrained, thus the impact of motivational types may not have been at levels that would allow for them to interact with constraints in any significant way. In a more practical setting, such as a work setting, more than likely there would be more ambiguity, and several situational constraints occurring at the same time. Thus in those situations, the role of motivation, constraints, frustration, task importance, and even self efficacy may then be more relevant, and thus interactions may be more likely.

Another limitation may be related to the measures used in the study. The measures of frustration, task importance, perceived constraints and self efficacy all used nominal Likert scales (strongly agree to strongly disagree) which may have not been ideal to accurately assess the participants' true levels of these continuous variable.

Perhaps use of numerical scales may have afforded more accurate levels of these variables. Further, Peters et al.'s (1980) 3 item scale may have been a better instrument to measure frustration than the items employed in this study.

Finally, although the results of this study may not have been as significant as expected, the present study was novel, and findings offer springboards for future research. First, research should be done to more closely examine how constraints are perceived at different levels. In this study, there were no differences between low and high levels of constraints. Future research could consider the prospect of a threshold or critical point that may allow for discrimination between different levels of constraints, rather than simply between having constraints vs. no constraints at all. I offered one possible explanation that the failure to distinguish between low and high levels of constraints in this study may have been a result of a lack of rewards or punishment outcomes tied directly to task performance. Adding such outcomes to the design in the future may help to determine if the ability to discriminate between levels of constraints could be enhanced, thus impacting performance and frustration more significantly.

Additionally, future research should consider using a more applied sample to conduct this research. The use of college students and their receipt of credits for participation is most likely the main explanation for the failure to successfully manipulate motivation. Future research should think about having volunteers sign up who may have greater interest in budgeting tasks (e.g. accountants), coupled with an extrinsic reward, such as a gift card (or a drawing for one) to help create a situation that may enhance the ability to manipulate motivation most effectively.

This study also found some evidence of the objective nature of situational constraints in terms of its relationship to self efficacy. Future research may want to examine this relationship more closely with an applied sample.

In summary, among some of the strengths associated with the present study, several limitations existed. Sample type, more specifically the use of college students, impaired the study's ability to successfully manipulate motivation and significantly detect effects. Future research should employ similar techniques as the present study using a more applied sample, and perhaps numerical scale measures for continuous variables.

APPENDICES

APPENDIX A

Instructions (Script for Video)

A. Identified Condition

Thank you for choosing to participate in this study on budget allocation. Tasks such as these are important not only for helping companies determine how to create budgets more efficiently, but doing the budget allocation task could help you feel more competent and confident when dealing with finances. These skills are important for you to possess as college students. In your packet you will find a short questionnaire to answer before you start, the budget sheet and another short questionnaire after you are completed

B. External Condition

Thank you for choosing to participate in this study on budget allocation. Tasks such as these are important not only for helping companies determine how to create budgets more efficiently, but doing the budget allocation task could teach you how to save money by allocating finances more efficiently. These skills can help you be financially successful in the future. In your packet you will find a short questionnaire to answer before you start, the budget sheet and another short questionnaire after you are completed

Both Identified and External Conditions

Next you will learn more about the company My Sprockets Inc., and your budget allocation task.

Welcome to My Sprockets Inc! The Nation's top producer of quality high definition sprockets for the leading brands of computers, high-definition TVs, and cars. Sprockets are the key to clear, crisp, and high definition, yet energy efficient, video entertainment.

We are constantly focused on providing the highest quality sprockets while trying to keep production costs down so as to cut costs for manufacturers, retailers, and ultimately customers. We are in the process of reworking our budgets due to broader economic changes. Based on our research, we have set our weekly production goal as 100 sprockets. 100 sprockets is our minimum per week. We encourage our employees to produce more than 100 when they can.

To produce sprockets we divide our working finances in two main ways: sprocket body and personnel salaries.

First, here is the process and budget we use to produce one actual sprocket:

There are 6 parts to a sprocket's body: spring, rubber insulation, switch, plastic case, hood, and microchip.

We work with one main supplier, this is our preferred supplier, but others are available to use if necessary. For our main supplier the price list is as follows:

| | | |
|--------------|-----------|---------------|
| Spring | \$ | 12.00 |
| rubber | | |
| insulation | \$ | 25.00 |
| switch | \$ | 15.00 |
| plastic case | \$ | 25.00 |
| hood | \$ | 20.00 |
| microchip | \$ | 103.00 |
| Total | \$ | 200.00 |

Next, in personnel there are three types of workers:

1. **Line workers** build the sprocket using the parts. They work 20 hours a week in teams of two. They make \$9/hr. and are paid weekly. Thus \$360 is allocated for the team salary per week. Each team has a goal of 100 sprockets per week.
2. **Quality Control workers** recheck the built sprockets to ensure My Sprockets Inc's reputed product quality. They work 20 hours a week in teams of two. They make \$10/hr and are paid weekly. Thus \$400 is allocated for the QC team salary per week. Each team has a goal of 100 sprockets per week.
3. **Technical Experts** check the technical quality and effectiveness of the sprockets to ensure My Sprocket Inc's reputed quality of electronic systems. My Sprocket Inc prefers that these systems are checked and cross-checked by up to 3 experts prior to packaging and shipping, but at least one expert is acceptable. . Experts work 40hr/week and are paid a weekly salary of \$1,500 each. Experts have a goal of up to 100 sprockets each per week. They are paid \$15.00 per sprocket checked after they have already checked the first goal 100 sprockets. \$1500-\$4500 are allocated for the expert salaries per week.

Your task today is to take the budget given to you in the envelope in front of you and use this information to allocate your finances to produce as many sprockets per week as possible. You are only responsible for allocating resources to produce sprockets, you do not have to produce work schedules. You have 30 minutes to complete this task. You

may use any notes you have made, and the budget information you will receive in the packet. You will be provided with scratch paper, calculators, erasers, pens, and pencils. You are allowed to ask the experimenter for clarification.

When you are finished please replace your packets in the envelope and return it to the experimenter. Once again thank you for your participation and good luck!

APPENDIX B
Identified/External Motivation

A. Identified Condition

Please indicate your agreement or disagreement with the following statements
with either

YES (yes I agree at least somewhat) or NO (No, I disagree completely).

Please CIRCLE your response.

- | | | |
|---|-----|----|
| 1. Mastering this budget allocation task is important to me. | YES | NO |
| 2. Mastering this task will help me understand budgeting better. | YES | NO |
| 3. It is important to me to know how to manage finances. | YES | NO |
| 4. Knowing how to budget well is important for me as a college student. | | |
| | YES | NO |
| 5. It is important to me to try to do well on this task. | YES | NO |
| 6. I value being able to learn about financial management from this task. | | |
| | YES | NO |
| 7. It is important to me to work on my budgeting skills. | YES | NO |

Please write 3-5 sentences about why you want to complete this budgeting task.

Focus on the value and meaning of completing this task to you.

B. External Condition

Please indicate your agreement or disagreement with the following statements
with either

**YES (yes I agree at least somewhat) or NO (No, I disagree
completely).**

Please CIRCLE your response.

1. I am doing this budget allocation task because others told me that I should.

YES NO
2. Financial management will help me make money in the future YES NO
3. This budget allocation task helps me get credit for a course I am currently
enrolled in YES NO
4. I am supposed to participate in a study as a part of my grade for a course.

YES NO
5. This task can help me learn to save money so I can have more in the future.

YES NO
6. My professor will be glad that I participated in this study YES NO
7. I may get some type of reward for participating in this study. YES NO

Please write 3-5 sentences about why you want to complete this budgeting task.

Focus on authority figures, pressure or rewards attached to you completing this task.

APPENDIX C

Relative Autonomy

Section C

Please choose the option that best fits you. Answer all questions.
Please circle your answers

Gender: M F

I did this budgeting task because:

1. Others told me I should do it

Very true Sort of true Not very true Not at all true

2. It will help me improve my grade in a course in which I am currently enrolled

Very true Sort of true Not very true Not at all true

3. I am supposed to do this task for class.

Very true Sort of true Not very true Not at all true

4. I may get a reward for doing this task.

Very true Sort of true Not very true Not at all true

5. I want my professor to think I am a good student, so I signed up for it.

Very true Sort of true Not very true Not at all true

6. I will feel bad if I did not do it

Very true Sort of true Not very true Not at all true

7. I will feel ashamed of myself if I did not get it done.

Very true Sort of true Not very true Not at all true

8. I will feel very proud of myself if I do well on this task.

Very true Sort of true Not very true Not at all true

9. I want to understand budgeting better.

Very true Sort of true Not very true Not at all true

10. It is important to me to know how to manage finances.

Very true Sort of true Not very true Not at all true

11. I want to learn new things about budgeting.

Very true Sort of true Not very true Not at all true

12. It is important for me try to do well at budgeting finances.

Very true Sort of true Not very true Not at all true

13. It is fun.

Very true Sort of true Not very true Not at all true

14. I enjoy doing these types of tasks.

Very true Sort of true Not very true Not at all true

15. I enjoy participation in lab studies.

Very true Sort of true Not very true Not at all true

16. I enjoy budgeting.

Very true Sort of true Not very true Not at all true

17. It is important for representing who I am.

Very true Sort of true Not very true Not at all true

18. Doing it makes me feel like an accomplished person.

Very true Sort of true Not very true Not at all true

19. Doing this task is important to my sense of self.

Very true Sort of true Not very true Not at all true

20. Helping solve a financial task makes me feel important as a person.

Very true Sort of true Not very true Not at all true

APPENDIX D

Budget Constraints Budget Spreadsheet for My Sprockets Inc. (with Constraint Levels Shown)

Sprocket Inc

Body

| Suppliers | Main | | Alt 1 | Alt 2 |
|--------------|------------------|----------|---------------------|-----------------|
| | \$ | | \$ | \$ |
| Spring | 12.00 | | 12.00 | 10.00 |
| rubber | \$ | | \$ | \$ |
| insulation | 25.00 | | 20.00 | 25.00 |
| | \$ | | \$ | \$ |
| switch | 15.00 | | 15.00 | 15.00 |
| | \$ | | \$ | \$ |
| plastic case | 25.00 | | 25.00 | 20.00 |
| | \$ | | \$ | \$ |
| hood | 20.00 | | 20.00 | 25.00 |
| | \$ | | \$ | \$ |
| microchip | 103.00 | | 100.00 | 100.00 |
| Total | \$ 200.00 | x | 100 units/wk | \$20,000 |

| job | salary/hr | salary/sprocket | hrs/week | no. of workers | total salary | max./ week |
|-----------------|-----------|-----------------|----------|----------------|--------------------|------------|
| | \$ | | | | \$ | |
| line workers | 9.00 | n/a | 20 | 2 | 360.00 | 100 |
| | \$ | | | | \$ | |
| quality control | 10.00 | n/a | 20 | 2 | 400.00 | 100 |
| | | | | | | |
| job | | salary | hrs/week | no. of workers | \$/spr aft 100 spr | avg /week |
| | | | | | \$ | |
| experts | min | \$ 1,500.00 | 40 | 1 | 15.00 | 100 |
| | | | | | \$ | |
| experts | max | \$ 4,500.00 | 40 | 2 | 15.00 | 100 |

Constraints

| | | |
|---------------------------------------|--------------|------------|
| Control Group (no constraints) | Grp A | 100 |
|---------------------------------------|--------------|------------|

Budget

| | |
|---------------------|--------------|
| \$ | sprocket |
| 20,000.00 | body |
| \$ | |
| 360.00 | line workers |
| \$ | quality |
| 400.00 | control |
| \$ | |
| 4,500.00 | 2 experts |
| \$ 25,260.00 | total |

| | | |
|-----------------------------|--------------|-----------|
| Low Constraint Group | Grp B | 90 |
|-----------------------------|--------------|-----------|

Budget

| | | |
|---------------------|--------------|-------------------------|
| \$ | sprocket | |
| 16,500.00 | body | |
| \$ | | |
| 360.00 | line workers | |
| \$ | quality | |
| 400.00 | control | |
| \$ | | |
| 3,000.00 | 2 experts | (option use one expert) |
| \$ 20,260.00 | total | |

| High Constraint Group | | Grp C | 70 |
|-----------------------|--------------|-------------------------|----|
| Budget | | | |
| \$ | sprocket | | |
| 12,500.00 | body | | |
| \$ | | | |
| 360.00 | line workers | | |
| \$ | quality | | |
| 400.00 | control | | |
| \$ | | | |
| 3,000.00 | 2 experts | (option use one expert) | |
| \$ 16,260.00 | total | | |

APPENDIX E
Budget Sheet for Participants

**Please refer to the Budget Training Module in your packet for all
Financial information**

**Remember your budget must cover sprocket body AND employee salaries*

YOUR BUDGET \$_(depends on condition)_

a. Sprocket Body

| PART | COST | SUPPLIER (MAIN/ A/B) |
|---------------------------|------|----------------------|
| Spring | \$ | |
| rubber insulation | \$ | |
| switch | \$ | |
| plastic case | \$ | |
| hood | \$ | |
| microchip | \$ | |
| Total per Sprocket | | |

b. Line Workers

Total Salary of line worker team of 2 \$ _____

Any sprockets over 100? Y N

If so, how much? _____

Line worker team salary for extra sprockets? \$ _____

c. Quality Control Workers

Total Salary of QC worker team of two \$ _____

Any sprockets over 100? Y N

If so, how much? _____

Line worker team salary for extra sprockets? \$ _____

d. Technical Experts

Number of experts 1 2 3 (please circle answer)

Total Salary allocated for experts \$ _____

Any sprockets over 100? Y N

If so, how much? _____

Salary for extra sprockets? \$ _____

Total number of sprockets you were able to produce? _____

Total amount of money spent (both sprocket body and workers) \$ _____

Please Circle your Answer

Section A

1. I felt that the budget restricted my ability to produce the desired number of sprockets

Strongly Disagree Disagree Neutral Agree Strongly Agree

2. I felt frustrated by this budgeting task because I had problems calculating the budget.

Strongly Disagree Disagree Neutral Agree Strongly Agree

3. I felt frustrated by the budgeting task overall.

Strongly Disagree Disagree Neutral Agree Strongly Agree

4. I felt that I had the ability to calculate the budget.

Strongly Disagree Disagree Neutral Agree Strongly Agree

5. I felt that I had the ability to complete the budgeting task overall.

Strongly Disagree Disagree Neutral Agree Strongly Agree

Section B

Please indicate your current major in college _____

1. This budgeting task is relevant to my major.

Strongly Disagree Disagree Neutral Agree Strongly Agree

2. Completing this budgeting task is important in my major.

Strongly Disagree Disagree Neutral Agree Strongly Agree

3. This budgeting task relevant to me.

Strongly Disagree Disagree Neutral Agree Strongly Agree

4. Completing this budgeting task is important to me.

Strongly Disagree Disagree Neutral Agree Strongly Agree

5. I care about how I perform on this budgeting task.

Strongly Disagree Disagree Neutral Agree Strongly Agree

APPENDIX F

Budget Training Module

**MY SPROCKETS INC
BUDGET TRAINING
MODULE**

SUPPLIES FOR SPROCKET BODY

We have one main supplier, we have a great relationship with them and their products help us maintain our high standards and quality.

| Suppliers | Main | | | |
|-------------------|------------------|----------|---------------------|-----------------|
| Spring | \$ 12.00 | | | |
| rubber insulation | \$ 25.00 | | | |
| switch | \$ 15.00 | | | |
| plastic case | \$ 25.00 | | | |
| hood | \$ 20.00 | | | |
| microchip | \$ 103.00 | | | |
| Total | \$ 200.00 | X | 100 units/wk | \$20,000 |

We have two other alternative suppliers that we consider from time to time. We use them if absolutely necessary.

PLEASE NOTE: It is our preference that if you buy items from one of the alternate suppliers that you buy all the parts that they supply from them, and then get the rest from the main supplier. You can however combine parts from all of the suppliers if you find it necessary. **If you use a combination of supplies from ALL THREE suppliers then YOU MUST USE TWO EXPERTS.**

| | Alternative A | Alternative B |
|-------------------|---------------|---------------|
| Spring | | \$ 10.00 |
| rubber insulation | \$ 20.00 | |
| switch | | |
| plastic case | | \$ 20.00 |
| hood | \$ 20.00 | |
| microchip | \$ 100.00 | \$ 100.00 |

**if there is no price listed, the price is the same as the main supplier*

WORKER SALARIES

LINE WORKERS:

- **Make \$9.00 per hour**
- **Can produce 5 sprockets and hour, must be paid per hour if they produce more than 100 sprockets (as a bonus).**
 - **For example if the make 101-105 sprockets they must be paid for an additional hour, also if they make 106-110 sprockets they must be paid for two additional hours, and so on.**
- **Must work in teams of two**
 - **This means that the salary for line worker teams is \$18.00 per hour. The same above rules apply when they produce more than 100.**
- **They work 20 hours a week.**
 - **This is standard. They can make 100 sprockets in this time frame.**
- **We allocate \$360/week to pay these teams.**
 - **This is also standard. Please remember that everything else above this is a bonus for producing more than 100 sprockets in the week.**
- **The standard target goal for line worker teams is 100 sprockets per week.**

QUALITY CONTROL WORKERS:

- **Make \$10.00 per hour**
- **Can produce 5 sprockets and hour, must be paid per hour if they produce more than 100 sprockets (as a bonus).**
 - **For example if the make 101-105 sprockets they must be paid for an additional hour, also if they make 106-110 sprockets they must be paid for two additional hours, and so on.**
- **Must work in teams of two**
 - **This means that the salary for line worker teams is \$20.00 per hour. The same above rules apply when they produce more than 100.**
- **They work 20 hours a week.**
 - **This is standard. They can make 100 sprockets in this time frame.**
- **We allocate \$400/week to pay these teams.**
 - **This is also standard. Please remember that everything else above this is a bonus for producing more than 100 sprockets in the week.**
- **The standard target goal for Q C worker teams is 100 sprockets per week.**

TECHNICAL EXPERTS:

- Are NOT paid hourly, they are paid weekly.
- Make \$1500 per week
- We prefer 2-3 experts to check the technical quality of sprockets, but one is acceptable (EXCEPT IF YOU USE A COMBINATION OF PRODUCTS FROM ALL THREE SUPPLIERS, THEN YOU MUST USE TWO EXPERTS)
- They work 40 hours a week.
 - This is standard. Their salaries are not affected by their hours.
- We allocate \$1500-\$4500 per week to pay these teams.
- As a bonus we pay experts \$15.00 per sprocket checked after they meet the weekly goal of 100 sprockets.
 - Remember if 1 expert checks the first 100, only one needs to check any past 100, if 2 experts check the first, then two need to check any past the first 100, as they are from the same batch etc....
- The standard target goal for technical experts is 100 sprockets per week.

EXAMPLE:

Here is an example of how to budget for 10 sprockets:

1. SPROCKET BODY:

Using the Main Supplier-

| | | |
|--------------|-----------|---------------|
| Spring | \$ | 12.00 |
| rubber | | |
| insulation | \$ | 25.00 |
| switch | \$ | 15.00 |
| plastic case | \$ | 25.00 |
| hood | \$ | 20.00 |
| microchip | \$ | 103.00 |
| Total | \$ | 200.00 |

It costs \$200 to make one sprocket body:

To make 10 sprocket bodies = $\$200 \times 10 = \2000

2. WORKERS:

a. Line workers –

Get paid \$9 per hour and must work in teams of two: $\$9 \times 2 = 18/\text{hr}$ for the team

It would take 2 hours to make 10 sprockets: $\$18 \times 2\text{hrs} = \36

b. QC-

Get paid \$10 per hour and must work in teams of two: $\$10 \times 2 = 20/\text{hr}$ for the team

It would take 2 hours to make 10 sprockets: $\$20 \times 2\text{hrs} = \40

c. Experts

Get paid weekly, and make \$1500 each (let's say they only had to check 10 sprockets this week)

You may use up to two experts; since we used the main supplier we have 2 options.

1 expert = \$1500

2 experts = \$3000

3 experts = \$4500

Total for making 10 sprockets with 1 expert ($\$2000 + \$36 + 40 + \$1500$) = \$3576.00

Total for making 10 sprockets with 2 experts ($\$2000 + \$36 + 40 + \$3000$) = \$5076.00

Total for making 10 sprockets with 2 experts ($\$2000 + \$36 + 40 + \$4500$) = \$6576.00

APPENDIX G

EXAMPLE OF BUDGET CALCULATIONS

BUDGET MUST INCLUDE ALLOCATION FOR BOTH SPROCKET BODY AND ALL WORKER SALARIES

**a. PARTS
(SPROCKET
BODY)**

| | | | | |
|-------------------|-----------|---------------|----------|----------------------------------|
| | Main | | | |
| Spring | \$ | 12.00 | | |
| rubber insulation | \$ | 25.00 | | |
| switch | \$ | 15.00 | | |
| plastic case | \$ | 25.00 | | |
| Hood | \$ | 20.00 | | |
| microchip | \$ | 103.00 | | |
| Total | \$ | 200.00 | x | 100 units/wk \$20,000 |

b. WORKERS

| Job | salary/hr | \$ after 100 sprockets | hrs/wk | no. of workers | total salary \$ | no. spr/wk |
|-----------------|-----------|----------------------------------|--------|----------------|-----------------|------------|
| | | Hourly wage for every 5 produced | | | | |
| line workers | \$ 9.00 | | 20 | Teams of 2 | 360.00 | 100 |
| | | Hourly wage for every 5 produced | | | | |
| quality control | \$ 10.00 | | 20 | Teams of 2 | 400.00 | 100 |
| experts | Pd weekly | \$15.00/sprocket | 40 | 1 | 1,500.00 | 100 |
| experts | Pd weekly | \$15.00/sprocket | 40 | 2 | 3,000.00 | 100 |
| experts | Pd weekly | \$15.00/sprocket | 40 | 3 | 4,500.00 | 100 |

**For example-
To produce 100 sprockets**

If I use the main supplier, sprocket body = \$20,000.00
 Line workers = \$ 360.00
 QC workers = \$ 400.00
 3 experts (best quality) = \$ 4500.00
Total = \$25,260.00

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TABLE 1

PETERS ET AL'S (1980) TABLE OF SITUATIONAL CONSTRAINTS

| | SITUATIONAL CONSTRAINT | DEFINITION |
|----|---|--|
| 1. | Job-Related Information | The information (from supervisors, peers, subordinates, customers, company rules, policies, and procedures, etc.) needed to do the job assigned. |
| 2. | Tools and Equipment | The specific tools, equipment, and machinery needed to do the job assigned. |
| 3. | Materials and Supplies | The materials and supplies need to do the job assigned. |
| 4. | Budgetary Support | The financial resources and budgetary support needed to do the job assigned — the monetary resources needed to accomplish aspects of the job, including such things as long distance calls, travel, job-related entertainment, hiring new and maintaining/retaining existing personnel, hiring emergency help, etc. This category does not refer to an incumbent's own salary, but rather to the monetary support necessary to accomplish tasks that are a part of the job |
| 5. | Required Services and Help from Others | The services and help from others needed to do the job assigned |
| 6. | Task Preparation | The personal preparation, through previous education, formal company training, and relevant job experience, needed to do the job assigned. |
| 7. | Time Availability | The availability of the time needed to do the job assigned, taking into consideration both the time limits imposed and the interruptions, unnecessary meetings, non-job-related distractions, etc. |
| 8. | Work Environment. | The physical aspects of the immediate work environment needed to do the job assigned — characteristics that facilitate rather than interfere with doing the job assigned, A helpful work environment is one that is not too noisy, too cold, or too hot; that provides an appropriate work area; that is well-lighted; that is safe; and so forth. |

APPENDIX I RESULT TABLES

TABLE 2
Means and Standard Deviations for All Variables

| Variable | <i>M</i> | <i>SD</i> | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
|--------------------------------|----------|-----------|---------|-------|---------|---------|--------|---------|--------|--------|--------|--------|--------|--------|----|
| 1 <i>Gender</i> | 1.56 | 0.50 | 1 | | | | | | | | | | | | |
| 2 <i>Motivation</i> | 1.52 | 0.50 | .102 | 1 | | | | | | | | | | | |
| 3 <i>Constraints</i> | 1.01 | 0.83 | -0.049 | -.040 | 1 | | | | | | | | | | |
| 4 <i>Self Efficacy</i> | 3.71 | 0.95 | 0.353** | .075 | -.231 | 1 | | | | | | | | | |
| 5 <i>Task Importance</i> | 3.50 | 0.66 | -0.067 | -.132 | .177 | 0.133 | 1 | | | | | | | | |
| 6 <i>Performance</i> | 1.05 | 1.59 | -0.073 | -.015 | -.399** | .092 | .077 | 1 | | | | | | | |
| 7 <i>Perceived Constraints</i> | 3.93 | 1.25 | .023 | .036 | .572** | -.139 | -.006 | -.334** | 1 | | | | | | |
| 8 <i>Frustration</i> | 2.72 | 1.06 | -.034 | -.034 | .145 | -.548** | -.174 | -.169 | .374** | 1 | | | | | |
| 9 <i>External</i> | 2.02 | 0.53 | .166 | .210* | -.025 | -.180 | -.135 | .110 | .026 | .082 | 1 | | | | |
| 10 <i>Introjected</i> | 1.38 | 0.65 | .044 | .215* | .002 | -.202 | .186 | .079 | -.066 | .157 | .299** | 1 | | | |
| 11 <i>Identified</i> | 2.39 | 0.58 | .110 | -.094 | -.048 | -.035 | .484** | .194 | -.212* | -.064 | -.049 | .190 | 1 | | |
| 12 <i>Integrated</i> | 1.42 | 0.75 | -.173 | -.032 | .040 | -.046 | .485** | -.033 | -.108 | .029 | .044 | .444** | .477** | 1 | |
| 13 <i>Intrinsic</i> | 1.48 | 0.75 | -.147 | .033 | -.126 | .213* | .414** | .163 | -.116 | -.249* | -.117 | .132 | .480** | .435** | 1 |

Internal consistency reliability estimates are plotted on the diagonal.

* Correlation is significant at the 0.05 level (two-tailed).

** Correlation is significant at the 0.01 level (two-tailed).

Gender was coded as 1 = male, 2 = female

Motivation was coded as 1 = identified, 2 = external

Constraints were coded as 0 = none, 1 = low, 2 = high

Self efficacy, Frustration, Task Importance, Perceived Constraints = 1 (strongly disagree) - 5 (strongly disagree)

Performance = .79 (low) – 1.27 (high)

External, Introjected, Identified, Integrated, Intrinsic = 1 (very true) - 4 (not at all true)

TABLE 3
Cell Means and Standard Deviations for Motivation Conditions and Subscales,
and Test of Simple Effects of Motivation Subscale at Each Motivation Condition

| Variable | External condition | | Identified condition | | ANOVA results | | |
|---------------------|--------------------|-----------|----------------------|-----------|---------------|-----------|-------------------------|
| | <i>M</i> | <i>SD</i> | <i>M</i> | <i>SD</i> | <i>F</i> | <i>df</i> | <i>Eta</i> ² |
| External subscale | 2.13 | 0.51 | 2.35 | 0.65 | 3.346 | 1,48 | 0.065 |
| Identified subscale | 1.90 | 0.54 | 2.46 | 0.50 | 24.75 | 1,44 | 0.360** |
| Total | 2.02 | 0.53 | 2.40 | 0.58 | 22.02 | 1,92 | 0.193** |

** $p < .001$

TABLE 4
Cell Means and Standard Deviations for Motivation Conditions and Subscales,
and Test of Simple Effects of Motivation Condition for Each Motivation Subscale

| Variable | External condition | | Identified condition | | ANOVA results | | |
|---------------------|--------------------|-----------|----------------------|-----------|---------------|-----------|-------------------------|
| | <i>M</i> | <i>SD</i> | <i>M</i> | <i>SD</i> | <i>F</i> | <i>df</i> | <i>Eta</i> ² |
| External subscale | 2.13 | 0.51 | 2.35 | 0.65 | 4.64 | 1,88 | 0.500* |
| Identified subscale | 1.90 | 0.54 | 2.46 | 0.50 | 0.58 | 1,88 | 0.100 |

* $p < .05$